





## THE STATISTICS OF MALIGNANT DECIDUOMA.<sup>1</sup>

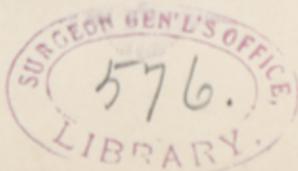
By W. A. NEWMAN DORLAND, A.M., M.D.,

Assistant Demonstrator of Obstetrics, University of Pennsylvania; Instructor in Gynecology, Philadelphia Polyclinic, etc., etc.

To the retention *in utero* of decidual or placental *débris* must be ascribed some of the graver sequences of parturition, be it mature or premature. Given this foreign material in the uterine cavity in any specific case, and it depends upon but a single factor—namely, the entrance or failure of access of pathogenic germs—as to what shall become of it. In by far the vast majority of such instances the result becomes a foregone conclusion. The sanguineous discharges, in part normal after labor, and in very large part abnormal and directly dependent upon the presence of the retained material, together with the existence of numerous abrasions along the parturient canal, furnish the most favorable conditions for the entrance and nourishment of germs, and a putrid odor quickly heralds the work of destruction that is going on within the uterus and vagina. Thus is developed one or other of the forms of puerperal sepsis with which the obstetrician of to-day is more thoroughly acquainted than he was but a decade ago.

If, on the other hand, through the observance of careful asepsis and antisepsis, the pathogenic microbes be excluded, there then results one of a number of rarer terminations of the accident. The non-septic fragments of extraneous tissue, according to the observations of Hartmann and Toupet,<sup>1</sup> who have made an exhaustive study of the subject, may either undergo (1) a slow sclerotic change, hardening and contracting, when they are ultimately discharged as a so-called *placental mole*; (2) there may be a failure of this sclerotic process to occur; but, on the other hand, a vascular connection may be established between the placental tissue and the uterine muscularis, and a distinct evolution occur in the retained chorionic villi, an innocent neoplasm thereby resulting, known as the *benign deciduoma* or true *placental polypus*, which will give rise to irregular and profuse hemorrhages that may even jeopardize the patient's life. After thorough removal by the curette such a growth shows no tendency whatever to recur; (3) the retained tissue may undergo a myxomatous change, and a true cystic disease of the chorionic villi result (the so-called *hydatidiform mole*); (4 and finally) the condition now becoming generally known as *malignant deciduoma* may develop and promptly terminate the patient's life

<sup>1</sup> Read before the Judson Da'land Medical Society of the University of Pennsylvania, March 22, 1897.



if it be not subjected to early and appropriate treatment. There is a very intimate, though not fully comprehended, relationship existing between the last two varieties of growth, in each the disease tending to invade and even perforate the uterine wall. This esoteric relationship has been most markedly emphasized in the rapidly growing literature on the subject, and has constituted one of the most intensely interesting features of the pathogenesis of the disease. It is probable that with the exception of the revival of symphyseotomy no subject in obstetrics has excited more general interest than the last-named condition,—namely, deciduoma malignum.

If we were to attempt a definition of this recently recognized neoplasm, we should say it is an exceedingly malignant growth from the pregnant or recently pregnant uterus, composed largely of proliferating decidual or placental tissue, of rapid growth and development, manifesting a marked tendency to the formation of metastatic deposits throughout the tissues and organs of the body, and quickly resulting fatally if prompt and radical measures of treatment be not instituted. A recent impregnation seems to be an essential feature in the etiology of the condition, and it matters not whether this impregnation be carried to full maturity or not. Indeed, the vast majority of the cases recorded have followed a premature termination of the gestation, either by simple abortion or more commonly after a cystic degeneration of the chorion has occurred, as has been already noted.

It is not within the province of the present paper to enlarge upon the pathologic features of the disease. These have been most carefully and minutely studied and described by Williams,<sup>2</sup> Marchand,<sup>3</sup> Spencer,<sup>4</sup> Jones,<sup>5</sup> and others, and for a closer investigation of this portion of the subject the reader is referred to these papers. Mention of the essential and characteristic features alone will be pertinent here. While closely resembling in many respects a sarcomatous growth, it differs from this type of neoplasm by the presence of peculiar and characteristic cells of large size containing nuclei, these cells bearing some likeness to the giant-cells of the myeloid sarcoma, but also closely resembling the true decidual cells of Friedländer, to be found in every normal gestation. It must, therefore, as suggested by Williams<sup>6</sup> in an able paper entitled "Contributions to the Histology and Histogenesis of Sarcoma of the Uterus," be regarded as a compound tumor,—a combination of uterine sarcoma with other, probably decidual, elements. This complex constitution undoubtedly contributes to the malignancy of the growth, for of the entire sarcomatous genus of neoplasms the deciduoma is undoubtedly by far the most malignant.

This uncertainty in the true pathogenesis of the disease has resulted in the origination of a large number of terms that have been

proposed in a futile attempt to designate the characteristic pathologic feature of the growth, and thereby locate it properly in the category of neoplasmata. Thus, in 1889, Sanger<sup>7</sup> suggested the name of "malignant metastatic deciduoma," and in a later paper,<sup>8</sup> on account of the marked proliferation of decidual cells that characterized the tumor, he calls the disease a "sarcoma uteri deciduo-cellulare." Menge<sup>9</sup> calls it "deciduo-sarcoma uteri;" Klien,<sup>10</sup> "deciduo-sarcoma uteri giganto-cellulare;" and Kustner,<sup>11</sup> "deciduarention-deciduo-adenoma uteri." Gottschalk<sup>12</sup> considered that the primary change occurred in the chorionic villi, a proliferation of the connective tissue taking place, and this, infecting the decidual cells, induced therein a sarcomatous growth. Arguing from such a basis he termed the condition "sarcoma chorion-deciduo-cellulare," and later<sup>13</sup> "sarcoma chorii." Guttenplan<sup>14</sup> and Pestalozza<sup>15</sup> bestowed the term of "infectious hemorrhagic sarcoma;" Jurgens,<sup>16</sup> that of "sarcoma teleangiectodes hemorrhagicum multiplex uteri et metastaticum colli uteri;" and Lohlein,<sup>17</sup> that of "sarcoma uteri partim deciduo-cellulare post myxoma chorii;" while Schmorl,<sup>18</sup> having faith in the parasitic origin of the disease, termed it "blastoma chorion-deciduo-cellulare."

Marchand,<sup>3</sup> on the other hand, believes that these tumors are of epithelial origin, and, therefore, carcinomatous in nature; and Nove-Josserand and Lacroix<sup>19</sup> are of the opinion that at least in part the growth has its origin from the cells of the uterine muscularis,—a theory absolutely denied by Williams.<sup>2</sup> Reasoning from the same basis Meyer<sup>20</sup> termed the disease "epithelioma papillare corporis uteri;" Klien,<sup>10</sup> "carcinoma of the chorionic villi;" and Klebs,<sup>21</sup> in speaking of Meyer's case, designated it as a "placental papilloma."

There have thus arisen two great points of dispute in the pathology of the disease,—namely, the true nature of the growth, whether it should be classed under the carcinomata or among the sarcomata; and, secondly, its point of origin, whether in fetal or maternal placental tissue. It is now very generally conceded that the tumor is partly sarcomatous in nature—an impure sarcoma—and, therefore, entitled to classification among the sarcomata. As to its point of genesis the views of the observer are not so unanimous, but the trend of opinion is toward the fetal origin of the disease, the fetal epithelial covering of the placenta,—the so-called syncytium ("a thin stratum of granular multinucleated protoplasm in which no cell-outlines can be distinguished"), probably first becoming involved in the degenerative process. Veit,<sup>22</sup> while admitting the fetal origin of hydatidiform mole, claims that when the malignant deciduoma follows it is very largely dependent upon a primary endometritis that has been of such a degree of severity as to greatly diminish the vitality of the uterine tissues, and thereby pre-

dispose to an extension thereto of the malignant change, they being unable to resist the encroachment of the disease; he even claims that in some cases there may have been a primary sarcomatous change in the endometrium, but in this he is not supported by other competent observers.

Thus far fifty-two authentic cases of the neoplasm<sup>1</sup>—that is, cases in which there can be but little doubt, if any, as to the true nature of the growth—have been recorded in the literature of the world. In addition to these there have been reported five other cases (Hegar,<sup>23</sup> Kaltenbach,<sup>24</sup> and Zweifel,<sup>25</sup> each one, and Veit,<sup>26</sup> two) in which the strong probability points to the decidual origin of the disease, but which cannot be classed among those that have been absolutely demonstrated by post-mortem and microscopic examination. Other still more doubtful cases have been recorded by Klotz,<sup>27</sup> Küstner,<sup>11</sup> Jarotsky and Waldyer,<sup>28</sup> Krieger,<sup>29</sup> and Volkmann.<sup>30</sup> Excluding these ten cases we have upon which to base our statistical study the fifty-two authentic cases which have been recorded in about the following chronologic sequence:

(1) Chiari.<sup>31</sup> Patient, aged 24 years. Number of previous pregnancies not reported. Suffered from repeated hemorrhages and constant sanguineous discharge following a labor at term. Death occurred without operation six months after the birth of the child. The autopsy showed the inner surface of the uterus irregular and granular, with small circumscribed nodules scattered throughout the wall, and metastatic deposits in both broad ligaments.

(2) Chiari.<sup>31</sup> Patient, aged 23 years. Hemorrhage began four weeks after the birth of the third child at term. She shortly developed hemoptysis, and died without operation six months after the labor. The autopsy showed irregular masses in the mucosa of the fundus and upper portion of the corpus uteri, with metastases in the lungs.

(3) Chiari.<sup>31</sup> Patient, aged 42 years. Hemorrhage occurred six days after a premature labor at the sixth month. Hemoptysis was shortly noticed, and the patient died, without operation, six months after the labor. The autopsy revealed an irregular mass in the anterior wall of the uterus, together with small circumscribed nodules throughout the substance of the organ. There were also metastatic deposits in the lungs, ovary, vagina, and pelvic lymphatic glands.

<sup>1</sup> Since this paper was written, there have been reported three additional authentic cases, as follows: C. Monod and L. Chabry (*Rev. de Gyn. et de Chir. Abdom.*), January and February, 1897. "A Case following Hydatidiform Mole cured by Vaginal Hysterectomy;" Reinicke (*Archiv für Gynäk.*, Band LIII, Heft 1); and Eindfore (*Cent. für Gynäk.*, No. 1, 1897), "A Case following Hydatidiform Mole;" this patient died on the fifth day after a vaginal hysterectomy. This gives a total of fifty cases to date.

— five

(4) *Jacobasch*.<sup>16</sup> Patient, aged 26 years. Had had previously two normal pregnancies. In January, 1880, she suffered a four months' abortion, and four months later perished from an intraperitoneal hemorrhage, the bleeding being due to the rupture of a bluish-red nodule the size of a hazel-nut, situated on the outer surface of the posterior wall of the uterus. In addition, there were found a tumor of similar character five by six centimetres in size in the fundus uteri, and six other smaller nodules varying in size from that of a pea to that of a walnut. No metastases were noted, and no microscopic examination of the growth was made.

(5) *Tibaldi*.<sup>32</sup> Patient, aged 31 years. Had had four previous pregnancies. The birth of the fifth child was followed by continuous hemorrhages, resulting shortly in death. The autopsy showed a mass in the uterus presenting characteristic features, with metastatic deposits in the brain, lungs, kidneys, colon, and ovary.

(6) *Guttenplan*.<sup>14</sup> Patient, aged 28 years. Had had seven previous pregnancies. Three months after the discharge of a hydatidiform mole the patient began to suffer from hemorrhages, which were shortly associated with hemoptysis, and resulted in early death. The autopsy revealed a characteristic growth in the uterus with metastases in the lungs and vagina.

(7) *H. Meyer*.<sup>20</sup> Patient, aged 55 years. Had had three children, the last ten years previously. Six months after the manual removal of a hydatidiform mole she began to suffer from hemorrhages, and died in three months' time of anemia. The autopsy was incomplete and metastases were not noted. The uterus was considerably enlarged, and its interior presented an irregular, nodular, and worm-eaten appearance. Scattered through its walls were numerous round nodules of a felty appearance, which varied in size from a grain of sand to a lentil.

(8) *Sänger*.<sup>7 8</sup> Patient, aged 23 years. Aborted in the eighth week with incomplete expulsion of the product of conception, as evidenced by profuse hemorrhage followed by a fetid discharge, lasting for three weeks. To relieve the septic condition the uterus was dilated and curetted. The fever and fetid discharge ceased, but the pulse remained above 100, and convalescence was delayed. There seemed to be an exudation to the left of the uterus, and the uterus itself was increased in size. Later, a distinct tumor appeared in the right iliac fossa, which was supposed to be an abscess. This was incised, and a mass of fungating tissue discovered, but no pus. The iliac bone was found rough and denuded at the bottom of the cavity, and the case was regarded as one of tuberculous periostitis, although no bacilli were found. The patient was cachectic and suffered with dyspnea. She

died seven months after the onset of her symptoms. Autopsy revealed four large, soft, spongy, reddish tumors in the uterine wall, the nodules varying in size from a walnut to a large apple. The uterine mucosa was smooth. Metastases were found in the right iliac fossa, both lungs, diaphragm, and tenth rib. The microscope showed a very hemorrhagic tumor composed of groups of large round cells with large nuclei, resembling those found in the decidua.

(9) Pfeiffer.<sup>33</sup> Patient, aged 35 years. Had had four normal pregnancies and one abortion. In December, 1888, she expelled a hydatidiform mole, after which everything seemed normal. In September, 1889, a profuse hemorrhage occurred, probably an abortion. The hemorrhage then persisted with hemoptysis until her death, on February 4, 1890. The autopsy revealed a characteristic growth in the uterine fundus and left wall, with metastases in the vagina and lungs.

(10) Pestalozza.<sup>15</sup> Patient, aged 25 years. Had had one previous pregnancy. She aborted February 1, 1888, after which hemorrhages persisted until the time of her death, August 1, 1888. The autopsy revealed a characteristic growth in the fundus uteri and anterior wall, with metastases in the vagina, broad ligaments, and lungs.

(11) Pestalozza.<sup>15</sup> Patient, aged 33 years. Had had five normal pregnancies previously. Hemorrhages began a little over a month prior to her death, and the autopsy revealed a characteristic growth in the uterus, especially in the anterior wall and fundus, with metastases in the vagina, broad ligament, and lungs.

(12) Pestalozza.<sup>15</sup> Patient, aged 45 years. Had had previously nine normal pregnancies. On December 26, 1889, she expelled a hydatidiform mole, after which she suffered from irregular hemorrhages until her death, March 30, 1891. The autopsy showed disseminated nodules of new growth in the anterior and posterior walls of the upper uterine segment, with metastases in the lungs.

(13) Pestalozza.<sup>15</sup> Patient, aged 32 years. Had had previously seven normal pregnancies. Hemorrhages occurred after a labor at term, April 17, 1894, and persisted until death, in October, 1894. No autopsy was made. A characteristic growth was noted in the uterus with metastases in the vagina.

(14) Pestalozza.<sup>15</sup> Patient, aged 22 years. Had previously had one pregnancy at term and one abortion. In February, 1894, she expelled a hydatidiform mole, after which hemorrhages occurred at irregular intervals. Vaginal hysterectomy was performed May 14, 1894, the patient recovering and remaining well one year later. There was a characteristic growth in the uterus. No metastases were discovered.

(15) Pestalozza.<sup>15</sup> Patient, aged 44 years. Had had twelve previous pregnancies, all normal except the first, which was ended in a traumatic abortion. On October 4, 1894, the patient expelled a hydatidiform mole, after which hemorrhages persisted. Vaginal hysterectomy was performed October 13, 1894, the patient recovering and remaining well one year later. A characteristic growth was found in the uterus. There were no metastases.

(16) P. Müller.<sup>34</sup> Patient, aged 30 years. Had had six previous pregnancies. In the seventh pregnancy she induced abortion at the fifth month. Some weeks later masses could be felt in the uterus, and hemorrhages occurred. The uterus was then emptied by the curette. A row of cystic tumors shortly appeared in the posterior vaginal wall, and the patient died five months after the abortion. The autopsy revealed a characteristic growth in the uterus and metastases in the vagina and gluteal region.

(17) Gottschalk.<sup>12 13</sup> Patient, aged 42 years. Had had two children and three abortions. After the last abortion, at the third month, profuse and continual hemorrhage occurred; the uterus was dilated several times, and a large amount of what appeared to be placental tissue was removed. Gottschalk then saw the case and removed with his finger from the uterine cavity about 150 cubic centimetres of red tumor-masses. The growth had penetrated the uterine wall, and he feared to remove all lest he perforate the organ. The portions removed consisted of villi that expanded at their ends into roundish masses, some of which were as large as a hazel-nut. The hemorrhages persisting, on August 16, 1892, Gottschalk removed the uterus *per vaginam*. It was very considerably enlarged, and at its upper right-hand margin and involving the fundus and the adjoining anterior and posterior walls, was a large jagged villous growth of a reddish color, which had almost perforated the uterine wall. The woman remained well for six months, but died two months later (March 11, 1893). Autopsy revealed placental-like metastases in the pelvis, lungs, spleen, and right kidney.

(18) Lebensbaum.<sup>35</sup> Patient, aged 27 years. Had had three previous pregnancies. Her fourth labor occurred at term, and hemorrhage occurred five weeks later, lasting eleven days. In spite of curettage the hemorrhages increased, and were associated with rigors. Vaginal hysterectomy was performed July 3, 1891, but the patient died in six days. A characteristic growth was found in the uterus and metastases in the vaginal wall.

(19) Schmorl.<sup>18</sup> The patient's age is not given. Hemorrhage began twelve weeks after a labor at term and persisted until the patient's death, six months later. The characteristic growth was found in the uterus, and metastases in the lungs.

(20) Koettnitz.<sup>36</sup> Patient, aged 25 years. Had had two previous normal pregnancies. After a third normal labor hemorrhages occurred at short intervals, associated with fever, rigors, and delirium. The patient died in ten weeks, and the autopsy revealed a characteristic growth in the uterus with metastases in the vagina and lungs.

(21) Löhlein.<sup>37</sup> Patient, aged 47 years. Had had seven previous pregnancies. In May, 1890, she expelled a hydatidiform mole. There was a cessation of the menses in the summer of 1891; then hemorrhages and a discharge after February, 1892. For two months the patient seemed quite well; then fever and the discharge returned. Vaginal hysterectomy was performed August 8, 1892, the patient recovering and remaining well until January 7, 1893, when she was last seen. The characteristic growth was found in the uterus. There was no metastases.

(22) L. Fraenkel.<sup>37</sup> Patient, aged 25 years. In July, 1892, expelled a hydatidiform mole in the third month of the pregnancy, after which she suffered with parametritis. Twenty months later, in February, 1894, she returned to the clinic in a very poor condition, having a markedly enlarged uterus with tumor-masses on either side of it. She complained bitterly of pain, and passed blood by the bladder. The tumors on either side of the uterus were removed by abdominal section and were found to be small ovarian cystomata. The uterus was stitched to the abdominal incision and opened when it was found to be filled with soft, reddish, placenta-like masses. The patient subsequently suffered severely with cough and headache, and died three months later (June 9, 1894). A partial autopsy was made. A soft, red, spongy tumor was found arising from the abdominal incision. The uterine wall was ulcerated through and its cavity communicated with the parametrial metastases, which in turn communicated with others in the vagina. The bladder and spleen also showed metastases, and the clinical symptoms indicated metastatic formations in the lungs and brain, which organs, however, were not examined.

(23) R. Klien.<sup>30</sup> Patient, aged 27 years. Had had two children, and one abortion, the latter in August, 1892. The menses were suppressed in November, 1892; flooding occurred January 26, 1893, and on March 3 a large vesicular mole was expelled. The flooding and pain continuing, the uterus was curetted on May 15, a left parametritis and salpingitis following. In September the patient became very ill with rigors, fever, and pain. Examination showed enlargement of the uterus. On November 7, 1893, a fatal hemorrhage occurred. Autopsy revealed a characteristic growth in the body and cervix of the uterus with metastases in the vagina, small pelvis, and both lungs.

(24) Paviot.<sup>38</sup> Patient, aged 48 years. Had suffered with uterine

hemorrhages for thirteen years, and had not been pregnant for twenty years. She died finally of anemia, and the autopsy revealed the uterus as large as the fetal head, its left and inferior portion being made up of an adenomatous growth, while its right and superior portion was composed of a dense and somewhat fragile and granular tissue. Metastases were found in the peritoneal cavity, mesenteric and prevertebral glands, lungs, liver, and kidneys; they were reddish in color, slightly granular, sharply defined, and readily enucleated from the surrounding tissues.

(25) Menge.<sup>9</sup> Patient, aged 35 years. Had had eight children and one abortion. On December 28, 1892, she was delivered at the sixth month of a large hydatidiform mole. In May, 1893, six months later, sharp metrorrhagia set in, and on dilating the uterus a hemispheric mass of the size of a bean was detected in the anterior uterine wall. This was removed by the curette in July. On August 3 a fresh hemorrhage occurred, and, after plugging and the use of the curette, some soft masses were removed, which, under the microscope, revealed cells of the decidual type. On August 11 vaginal hysterectomy was performed. Metastatic deposits were found in the vaginal vault, and it was impossible to remove the diseased parts without fouling the peritoneum; hence there was subsequent high temperature and convalescence was protracted to two months. November 21, three and a half months after the operation, small metastatic deposits were detected in the vaginal wall close to the vulvar orifice. They grew very rapidly, sloughing and causing fetor and edema of the labia, and the patient died six months after the operation and thirteen months after the expulsion of the mole.

(26) Hartmann and Toupet.<sup>29</sup> Patient, aged 25 years. Had had a child eighteen months before admission into the hospital. Menstruation occurred during the last six months of lactation; the periods then ceased for three months after a very free hemorrhage. Then for three months there was an almost continuous oozing of blood, terminating in another profuse bleeding which was associated with fever and rigors, and which lasted a fortnight. The uterus was dilated and curetted, but the hemorrhage persisted for a month, at which time the patient died during a severe exacerbation of the flow accompanying the expulsion of a mass resembling placental tissue, eight months after the appearance of the first symptom. The autopsy was incomplete. The left angle of the uterus and its posterior wall were occupied by a blackish mass that resembled placental tissue, and two nodules the size of a hazel-nut were situated in the fundus and posterior wall; they extended through the entire thickness of the uterine wall, were grayish-white in color, soft, and continuous with placental-like masses that

projected from the interior of the uterus. In addition, the uterine wall was studded with many similar but smaller nodules, all of which were developed within veins. No metastases were found in the other abdominal viscera.

(27) Jeannel.<sup>40</sup> Patient, aged 26 years. Had had an abortion in January, 1893, and was then regular until March, 1894, when hemorrhages began and persisted until a vaginal hysterectomy was performed, May 3, 1894. The patient recovered and was well when seen December 20, 1894. A characteristic growth was found in the uterus.

(28) Nové-Josserand and Lacroix.<sup>19</sup> Patient, aged 24 years. Had had two children, the last two and one-half years before. In March, 1892, she expelled a hydatidiform mole, and one month later began to have hemorrhage from the womb, which was then explored digitally. At one point in the anterior wall near the fundus the uterine tissue was very soft, and some fragments removed by the finger-nail revealed, when examined microscopically, a large-celled infiltration of the uterine muscle. Bleeding persisting, a vaginal hysterectomy was performed July 12, 1893, the patient recovering, and remaining well three months later. The uterus was one-third larger than normal; in its posterior wall was a pedunculated, reddish-brown, soft tumor, full of blood, and the size of a nut. Similar growths were found deep in the muscular tissue of the anterior wall. On microscopic examination these tumors were seen to consist of large cells, partly resembling in their arrangement epithelial carcinoma, partly sarcoma. The cells penetrated into the interspaces of the smooth muscular fibres, into the arteries, veins, and lymph-vessels, and developed under the endothelium. No other metastases were found.

(29) Marchand.<sup>3</sup> Patient, aged 34 years. Had had nine children, the last November 26, 1893. Three weeks after the birth of this child uterine hemorrhages occurred, and persisted until a vaginal hysterectomy was performed, on April 20, 1894. The patient made a good recovery, and was well when seen in the following October. A characteristic growth was found in the fundus uteri.

(30) Schauta.<sup>41</sup> Patient, aged 29 years. Had had four previous pregnancies. During her fifth pregnancy she suffered from repeated bleedings, which became free in the seventh month of gestation, and persisted over a fortnight. A hydatidiform mole was then removed, but hemorrhages with a free aqueous discharge persisting, the uterus was exposed six weeks later, and soft masses found projecting into the cavity. The uterine body was soft and enlarged, and there was also a tough, dark-blue swelling on the posterior vaginal wall, the size of a nut. There were two separate pelvic tumors. Microscopic examination of the scrapings proved the growth to be a deciduo-sarcoma and

vaginal hysterectomy was performed on November 21, 1894, the patient recovering and remaining well one and a half years later. The ovaries were found to be considerably enlarged and were also removed, and the vaginal deposit was excised. Not only the endometrium but also the vaginal deposit and the connective tissue of the ovaries contained new growths resembling decidual tissue.

(31) Superno.<sup>42</sup> Patient, aged 32 years. Had had five previous pregnancies, the last child being born ten months before. In the third month of the sixth pregnancy the patient expelled a hydatidiform mole, which was followed by hemorrhage and pain. A vaginal hysterectomy was performed September 14, 1892, the patient recovering and remaining well one year later. A characteristic growth was found in the uterus.

(32) Resinelli.<sup>43</sup> Patient, aged 28 years, who had had three normal labors, the last on March 28, 1890. The fourth pregnancy aborted in the third month during an attack of influenza. Three months later (November, 1891) a small tumor appeared in the vestibule of the vagina, and a pelvic examination revealed an infecting sarcoma of the uterus with metastases in the vagina and abdominal viscera. The patient died March 14, 1892, and the autopsy revealed a characteristic growth in the uterus at the origin of the right tube, with metastases in the lungs, face, vaginal wall, and liver.

(33) Boldt.<sup>44</sup> Patient, aged 33 years, aborted at the fourth month, shortly after which a sanguineous discharge again occurred. Her physician curetted the uterus. Four months later the uterus was greatly enlarged and the patient profoundly anemic. A microscopic examination of the *débris* showed the characteristic decidual cells. A pleurisy with effusion took place shortly, and the patient died a few months later. No autopsy was permitted.

(34) Kuppenheim.<sup>45</sup> Patient, aged 33 years. Had had five previous pregnancies, the last in June, 1894. Hemorrhage occurred three weeks after the birth of the child and persisted until a vaginal hysterectomy was performed, August 20, 1894. The patient recovered and remained well in June, 1895. A characteristic growth was found in the uterus.

(35) Tannen.<sup>46</sup> Patient, aged 23 years. Had had two former pregnancies. The third pregnancy resulted in a hydatidiform mole, which was discharged in July, 1893. The patient was then regular and well until January, 1894, when hemorrhages began and persisted until June 30, when a vaginal hysterectomy was performed. The woman recovered and was well nine months later. A characteristic growth was found in the uterine wall.

(36) Ahlfeld.<sup>47</sup> Patient, aged 17 years, whose menses had been

regular until Christmas, 1893, after which they became more profuse than usual, so that in April, 1894, she was obliged to consult a physician on account of profuse hemorrhages, which had lasted for three weeks. After rest in bed they ceased, and she was well until June, 1894, when she suffered another profuse hemorrhage, which came from a soft, reddish tumor, the size of a walnut, which was situated on the lower portion of the anterior vaginal wall. This was removed and the uterus curetted, the scrapings showing nothing abnormal. The vaginal growth recurred with great rapidity, and soon another appeared beside it. At the same time a tense tumor manifested itself above the symphysis. July 4 she developed the symptoms of peritonitis, and during an abdominal section she died. The autopsy showed the uterus to be perfectly normal, and that the growth arose from the left tube, which had been the seat of a tubal pregnancy. Besides the metastases in the vagina there were numerous small placenta-like thrombi in the lungs, but none in other organs.

(37) Williams.<sup>2</sup> Negress, aged 35 years. Had had five pregnancies, the third ending in a miscarriage at the sixth month. On April 15, 1894, she was delivered of a dead child, and suffered from postpartum hemorrhage and septicemia. Two weeks after delivery a tumor appeared on the right labium majus, and one week later had attained the size of a walnut. It soon became gangrenous and ulcerated on the surface. In another week it was as large as a hen's egg. The patient died July 12, 1894, three months after labor. At the autopsy there was found a smaller mass on the left lateral vaginal wall, and on the posterior wall of the uterus a mass projected into the uterine cavity, while smaller tumors, the size of almonds, were found in the fundus. A similar growth the size of a hazel-nut was found in the hilum of the left ovary, and numerous metastatic deposits in the lungs, spleen, liver, and kidneys.

(38) Bacon.<sup>48</sup> Patient, aged 48 years. Had had six children and two abortions. In December, 1892, in the ninth month of her ninth pregnancy, she expelled a hydatidiform mole. Five weeks later she began to have hemorrhages which recurred frequently; and she died in hospital June 25, 1893, having presented the following series of symptoms: recurrent metrorrhagia, secondary anemia, bilateral pleuropneumonia, endocarditis, septicemia, bed-sores, edema of the legs. The autopsy revealed a characteristic tumor in the uterus with secondary deposits in the right broad ligament and lungs.

(39) Champneys.<sup>49</sup> Patient, aged 18 years. Had had one child in May, 1890. Became pregnant again in September, 1890, and on March 22, 1891, had a profuse discharge of pale-red, clear fluid, containing clots and bladder-like bodies. About four pints escaped. The

discharge continued in smaller quantities until April 8. On April 9 she suffered a profuse hemorrhage and discharged a hydatidiform mole, after which she had septicemia. Was curetted on April 13, and left the hospital on May 22. Hemorrhage returned July 20, accompanied by an offensive discharge and abdominal pains, with fever and rigors. She was anemic and emaciated, and gradually failed until her death, December 12, 1891. Autopsy revealed a sloughing condition of the uterine walls with metastases in the lungs.

(40) Runge.<sup>50</sup> Patient, aged 44 years; a multipara, whose last child was born three years before. She had had profuse hemorrhages for five months, after which she passed a hydatidiform mole. The hemorrhages persisting, abdominal hysterectomy was performed October 28, 1895, the patient recovering and remaining well three months later. A characteristic growth was found in the uterus.

(41) Appelstedt and Aschoff.<sup>51</sup> Patient, aged 33 years. Had had two children. On October 4, 1894, she suffered an abortion at the fourth month, the fetus being macerated. Profuse menstruation occurred in December, 1894, and January, 1895, with a bloody discharge between. A "polypus" was then removed, and the patient discharged in February. She was readmitted in May with a bloody discharge, and a vaginal hysterectomy was performed May 24, 1895, the patient dying, however, June 19. Autopsy showed a characteristic growth in the body of the uterus, extending to within a few millimetres of the peritoneum, with metastases in the lungs, stomach, and pancreas.

(42) Appelstedt and Aschoff.<sup>51</sup> Patient, aged 42 years. Had had two children, one in 1882, and the second in 1886. She expelled an hydatidiform mole, March 28, 1895, and eight days later developed a painful swelling in the left labium majus. On incising this a metastatic hydatidiform mole was found. The patient experienced repeated hemorrhages and died July 25, 1895. Autopsy revealed a characteristic growth in the uterus, with metastases in the paravaginal cellular tissue, left labium, lungs, and spleen.

(43) Lönnberg and Mannheimer.<sup>52</sup> Patient, aged 38 years; a multipara. Was delivered in November by forceps at term. Two months later, metrorrhagia having continued for four weeks, an examination was made and a mass of fibrin discovered. In January the cervix was dilated and a tumor the size of an almond removed from the anterior uterine wall by means of the curette. The bleeding grew worse, and masses of decidual substance were expelled. Emaciation became marked, and the patient died six months after delivery. A characteristic growth was found in the uterus with metastatic deposits in the lungs, liver, spleen, kidneys, and abdominal lymphatics.

(44) Lönnberg and Mannheimer.<sup>52</sup> Patient, aged 42 years. Had

had two children. The third pregnancy ended at the fourth month, on November 19, 1893, a large vesicular mole being expelled. Seven weeks later metrorrhagia set in and continued for nearly two years. The body of the uterus was as large as a fist, and metastatic deposits were found in the vagina. The uterus was removed October 18, 1895, and on October 30 the vaginal metastases were excised. The patient recovered and was in good health April 1, 1896. A characteristic growth was found in the uterus.

(45) Morison.<sup>53</sup> Patient, aged 35 years. Had had nine children. Hemorrhages occurred nine weeks after the last labor, and persisted until a vaginal hysterectomy was performed, December 11, 1894. The patient died July 11, 1895. A characteristic growth was found in the uterus.

(46) Spencer.<sup>54</sup> Patient, aged 27 years. Had had one child seven years before. Three weeks after a normal labor, with a living child, hemorrhage occurred and masses of growth were discharged. The patient died ten weeks after labor, and the autopsy showed a characteristic growth in the body and cervix uteri and metastases in the lung.

(47) Laver and Wilkinson.<sup>55</sup> Patient, aged 21 years. Had had one child three years before. In May, 1892, she became pregnant a second time, but aborted at the end of the third month, and for five months suffered from a constant slight loss. Flooding then occurred at each succeeding menstrual period, and she was admitted to the hospital June 8, 1893, in an anemic condition. August 11 the uterus was curetted, the hemorrhage ceasing for three weeks, and then returning. On October 4 vaginal hysterectomy was performed. The patient became septic, and on November 9 developed fever and rigors, and a dulness over the base of the right lung, which soon extended to the entire back of that lung. Dyspnea was marked, and the patient died December 15, 1893, with all of the signs of recurrence of the disease in the lungs. No autopsy was allowed.

(48) Leopold.<sup>56</sup> Patient, age not given. Was delivered June 25, 1895. Puerperium apparently normal. The menses reappeared three months later, and from that time on she flowed irregularly every two weeks and suffered from severe abdominal pain, which was ultimately followed by collapse. Examination showed the uterus pushed to the right side and enlarged, with a doughy mass behind in Douglas's cul-de-sac. On opening the abdomen, June, 1896, two litres of dark fluid blood escaped. Both tubes were normal, but the anterior wall of the fundus uteri showed from six to eight dark-bluish protuberances, one of which had ruptured and was the source of the bleeding. The uterus was removed. The patient rallied under the use of hypo-

dermoclysis. The uterus was found to contain a soft mass which had grown into and penetrated the muscularis. No microscopic examination was made.

(49) Neumann.<sup>57</sup> Patient, aged 29 years. Had had four previous pregnancies, the first ending in an abortion at the first month, the rest being normal. The fifth pregnancy terminated in the sixth month with the expulsion of a hydatidiform mole. Six weeks later the uterus contained a new growth which had formed metastases in the vagina, and which was accompanied by profuse hemorrhages. One month later the uterus with the diseased adnexa and a portion of the posterior vaginal wall were removed by vaginal celiotomy, the patient recovering and remaining well one and a half years after operation.

(50) Neumann.<sup>57</sup> Patient, aged 51 years. Had had twelve children. In January, 1893, suppression of the menses occurred, and in February the woman commenced to bleed, the hemorrhage being more or less constant from the middle of March until the 12th of April. On May 6 a hydatidiform mole was removed, and the hemorrhage which followed being uncontrollable, the uterus was removed by the abdominal operation. The patient, however, died May 9, of right lobular pneumonia, peritonitis, and left pyothorax. A microscopic examination of the uterine contents showed a beginning malignant degeneration of the chorionic villi. There were probably metastases in the lungs.

(51) K. Aczél.<sup>58</sup> Patient, aged 22 years. Had aborted twice, and nine months before her death gave birth to a child, which died in three months' time. Uncontrollable bleeding from the genitalia followed the confinement, associated with marked pulmonary symptoms, and the patient died in August, 1890. Autopsy revealed a friable tumor in the fundus uteri, and the cervix, vagina, and lungs were the seats of metastases. The latter were hard, circumscribed nodules, showing upon section straight or convoluted structures of cylindrical form, yellow in color, and separated from each other by grayish-red tissue. The basement-substance was hyaline in character, with numerous interstitial hemorrhages. The irregularly dispersed cells showed prominently on account of their size and form. In places they were arranged in groups resembling chorionic structure.

(52) Cock.<sup>59</sup> Patient, aged 30 years. Had had three previous pregnancies, and was delivered of her fourth child three weeks prior to her admission to the hospital, the labor being normal and the placenta<sup>o</sup> complete. She rose on the fourteenth day and suffered at once from a slight hemorrhage. On rising two days before her admission she had a profuse hemorrhage. On June 20, 1896, the os was dilated,

and a mass adherent to the posterior wall of the uterus and feeling like placental tissue was removed by the finger and curette. Sepsis developed, and on July 14 there occurred a profuse discharge of blood-stained serum and clots. On the next day the os was found to be patulous, and a rough mass, unassociated with feto, projected. This grew from the posterior wall and consisted of pale organized tissue. On its removal the uterine wall was found to be very thin. Sepsis again followed, and the antistreptococcic serum was injected, but the patient died July 25. Autopsy revealed a characteristic growth in the posterior wall of the uterus, irregular, pinkish, and granular, with metastases the size of a pea to a small walnut, deep red in color, in the lungs and right ovary. A microscopic examination showed the characteristic features.

From a systematic study of the foregoing cases we are able to arrive at some very interesting and conclusive facts as to the symptomatology and course of this rare and curious neoplasm.

(1) In the first place, as to its *malignancy*. As we have already stated, this growth must be regarded as the most malignant of all forms of malignant tumors. This fact is demonstrated by three characteristic features of the reported cases,—namely, (1) the early and exceedingly rapid development; (2) the great tendency to recurrence and to the formation of metastases; and (3) the high mortality record.

In thirty-one of the cases (59.6 per cent.) the symptoms manifested themselves either at once after labor or within four weeks' time; in five cases (9.6 per cent.) they appeared during the second month after labor; in six cases (11.5 per cent.) during the third month; in five cases (9.6 per cent.) during the fourth month; in one case (1.9 per cent.) not until the seventh month; in one case (1.9 per cent.) the patient had not been pregnant for twenty years, and had had more or less constant bleeding for thirteen years.

Of the fatal cases three (or 7.94 per cent.) died "shortly" after the appearance of the symptoms, the precise time not being stated. In 78.97 per cent. death occurred within six months of the appearance of the symptoms. Thirty-eight of the fifty-two cases died of the primary condition or from a recurrence of the growth, thus giving an absolute mortality for malignant deciduoma of 73 per cent. In one instance only (Williams) did the tumor occur in a colored woman.

Metastases were noted in 70.76 per cent. of the cases. These secondary deposits were found in the following situations in the order of their frequency: Lungs, 78.37 per cent.; vagina, 54 per cent.; spleen, kidneys, and ovary, each 13.51 per cent.; liver, broad ligament, and pelvis, each 10.8 per cent.; brain twice, 5.4 per cent.; and the colon,

right iliac fossa, diaphragm, tenth rib, gluteal region, abdominal wall, bladder, peritoneal cavity, mesenteric glands, prevertebral glands, face, stomach, pancreas, left labium, and abdominal lymphatics, each once, 2.7 per cent.

(2) *The Age of the Patient.*—Necessarily, from the nature of the growth, it appears mainly in early life and during the period of sexual activity. The cases were distributed as follows: In two instances the age is not mentioned; between 15 and 20 years there were two cases (3.84 per cent.); between 20 and 25 years, twelve cases (23.07 per cent.); between 25 and 30 years, eleven cases (21.15 per cent.); between 30 and 35 years, twelve cases (23.07 per cent.); between 35 and 40 years, one case (1.92 per cent.); between 40 and 45 years, seven cases (13.46 per cent.); between 45 and 50 years, three cases (5.76 per cent.); and between 50 and 55 years, two cases (3.84 per cent.). It will thus be seen that thirty-seven cases (or 71.15 per cent.) occurred before the fifth decade.

(3) *The Number of Previous Pregnancies.*—In ten of the cases no mention is made as to the number of gestations that preceded the development of the tumor. Twice (3.84 per cent.) it appeared in primiparæ, in Ahlfeld's case, occurring after an illegitimate tubal pregnancy that had not been recognized prior to the death of the patient. Five times (9.61 per cent.) it followed the second pregnancy; ten times (19.23 per cent.) it succeeded the third gestation; five times (9.61 per cent.) it followed the fourth; six times (11.53 per cent.) the fifth; twice (3.84 per cent.) the sixth; three times (5.76 per cent.) the seventh; once (1.92 per cent.) the eighth; four times (7.69 per cent.) the ninth; twice (3.84 per cent.) the tenth; and twice (3.84 per cent.) the thirteenth pregnancy.

(4) *The Nature of the Pregnancy immediately preceding the Development of the Deciduoma.*—Here we find a very interesting coincidence,—namely, the close association existing between the occurrence of a vesicular mole and the appearance of a malignant deciduoma. In the fifty-two cases reported the nature of the previous gestation was as follows: In one case (Paviot's) the woman had not been pregnant for twenty years, and once (Ahlfeld) the growth followed a tubal gestation in a single girl of 17. Once (1.92 per cent.) it followed a premature labor at the sixth month; twelve times (23.07 per cent.) it occurred after abortions, two of these patients, however, having previously expelled hydatidiform moles, one nine months before, and the other two years before; seventeen times (32.69 per cent.) it followed labor of term, and twenty times (38.46 per cent.) the discharge of a hydatidiform mole. In 42.3 per cent. of the cases (22) the patients presented a history of the expulsion of a vesicular mole at some time prior to the appearance of the disease.

(5) *The Symptoms*.—The clinical manifestations of malignant deciduoma are the early occurrence of profuse and repeated hemorrhages from the uterus; the appearance in the uterine cavity of a characteristic growth, associated at times with a fetid and sanguineous leucorrhœa which may contain shreds of tissue; pelvic pain; the development of profound anemia and cachexia with extreme prostration and emaciation; frequently the occurrence of hemoptysis (indicating pulmonary metastasis) with or without pleurisy; grave septic manifestations (elevation of temperature, duskiness of the skin, repeated rigors, and occasionally delirium); and the formation of metastatic deposits in other portions of the body. Edema of the vulva and lower extremities may be noted, and an early fatal termination may be expected unless prompt extirpation of the uterus is resorted to.

## BIBLIOGRAPHY.

- <sup>1</sup> *Hartmann and Toupet*: Annales de Gynécologie et d'Obstétrique, April, 1895.
- <sup>2</sup> *Williams, J. W.*: Johns Hopkins Hospital Reports, Vol. IV, No. 9, 1895; also American Journal of Obstetrics, 1895, p. 319.
- <sup>3</sup> *Marchand*: Monatsschrift für Geburtshülfe und Gynäkologie, Band I, S. 419-513, June, 1895.
- <sup>4</sup> *Spencer, H. R.*: Quarterly Medical Journal, July, 1896.
- <sup>5</sup> *Jones, H. Macnaughton*: British Gynecological Journal, November, 1896, p. 350.
- <sup>6</sup> *Williams, J. W.*: American Journal of Obstetrics, Vol. XXIX, No. 6, 1894.
- <sup>7</sup> *Sänger*: Centralblatt für Gynäkologie, Band XIII, S. 132, 1889; also Verhandlungen der deutschen Gesellschaft für Gynäkologie, Band IV, S. 333, 1892.
- <sup>8</sup> *Sänger*: Archiv für Gynäkologie, Band XLIX, S. 89-149, 893.
- <sup>9</sup> *Menge*: Zeitschrift für Geburtshülfe und Gynäkologie, Band XXX, Heft 2, 1894.
- <sup>10</sup> *Klien, R.*: Archiv für Gynäkologie, Band XLVII, Heft 2, S. 243-305, 1894.
- <sup>11</sup> *Küstner*: Archiv für Gynäkologie, Band XVIII, S. 252-262, 1881.
- <sup>12</sup> *Gottschalk*: Berliner klinische Wochenschrift, No. 4, 1893.
- <sup>13</sup> *Gottschalk*: Archiv für Gynäkologie, Band XLVI, Heft 1, S. 1-100, 1894.
- <sup>14</sup> *Guttenplan*: Dissert. Inaug. Strassburg, 1883.
- <sup>15</sup> *Pestalozza*: Il Morgagni, XXXIII, September, 1891; also Annali di Ostet. e Gin., 1895, pp. 743-772.
- <sup>16</sup> *Jacobasch*: Zeitschrift für Geburtshülfe und Gynäkologie, Band VII, S. 53, 1882.
- <sup>17</sup> *Löhlein*: Centralblatt für Gynäkologie, S. 297-301, 1893.
- <sup>18</sup> *Schmorl*: Centralblatt für Gynäkologie, No. 8, S. 169, 1893.
- <sup>19</sup> *Nové-Josserand and Lacroix*: Annales de Gynécologie, Tome LXI, pp. 100-124, 216-247, 317-332, 1894; also Provençal Médicale, Nos. 2 and 8, 1894.
- <sup>20</sup> *Meyer, H.*: Archiv für Gynäkologie, Band XXXIII, S. 53-61, 1888.
- <sup>21</sup> *Klebs*: Die allgemeine Pathologie, II Theil, S. 690, 1889.
- <sup>22</sup> *Veit*: Zeitschrift für Geburtshülfe und Gynäkologie, Band XXXII, Heft 1, 1895.
- <sup>23</sup> *Hegar*: Verhandlungen der deutschen Gesellschaft für Gynäkologie, IV, 1892.
- <sup>24</sup> *Kaltenbach*: Verhandlungen der Xten Internationale Kongress, Band III, Abtheil VII, S. 71, 1890.
- <sup>25</sup> *Zweifel*: Centralblatt für Gynäkologie, No. 11, S. 265, 1894.
- <sup>26</sup> *Veit*: Volkmann's Sammlungen klinische Vorträge, No. 254, S. 6, 1885; also Zeitschrift für Geburtshülfe und Gynäkologie, Band VI, S. 261-332, 1886.
- <sup>27</sup> *Klotz*: Archiv für Gynäkologie, Band XXIX, S. 78-96, 1887.

- <sup>28</sup> *Jarotsky and Waldeyer* : Virchow's Archives, Band XLIV, S. 88-94, 1868.
- <sup>29</sup> *Krieger* : Berliner Beiträge zur Geburtshülfe und Gynäkologie, Band I, S. 10-15, 1872.
- <sup>30</sup> *Volkmann* : Virchow's Archives, Band XLI, S. 528-534, 1867.
- <sup>31</sup> *Chiari* : Wiener medicinische Jahrbücher der Kinderheilkunde Gesellschaft der Aerzte, Band VII, S. 363-368, 1877.
- <sup>32</sup> *Tibaldi* : Gazzetta d. Osped., No. 58, 1882.
- <sup>33</sup> *Pfeiffer* : Prager medicinische Wochenschrift, No. 26, 1890.
- <sup>34</sup> *Müller, P.* : Verhandlungen der deutschen Gesellschaft für Gynäkologie, IVten Kongress, 1891, S. 342, 1892.
- <sup>35</sup> *Lebensbaum* : Centralblatt für Gynäkologie, S. 112-121, 1893.
- <sup>36</sup> *Koettwitz* : Deutsche medicinische Wochenschrift, No. 21, 1893.
- <sup>37</sup> *Fraenkel, L.* : Archiv für Gynäkologie, Band XLVIII, S. 80-105, 1895 ; also reported by Perske, Dissert. Inaug. Greifswald, 1894.
- <sup>38</sup> *Paviot* : Annales de Gynécologie et d'Ob-tétrique, Tome XLI, pp. 306-317, 1894.
- <sup>39</sup> *Hartmann and Toupet* : Bulletin de la Société Anatomie de Paris, October, 1894, p. 723 ; also reported by Beach, Thèse de Paris, 1894 ; also ANNALS OF SURGERY, Vol. XXI, No. 5, pp. 524-543, 1895.
- <sup>40</sup> *Jeannel* : Annales de Gynécologie et d'Ob-tétrique, Tome XLII, pp. 371-375, 1894 ; also Archives de Tocologie, 1895.
- <sup>41</sup> *Schauta* : Centralblatt für Gynäkologie, No. 9, S. 248, 1895.
- <sup>42</sup> *Superno* : Annali di Ostet. e Gin., 1895, p. 775.
- <sup>43</sup> *Resinelli* : Annali di Ostet. e Gin., 1895, p. 775 ; also Gaz. Heb. de Méd. et de Chirurgie, April 9, 1896.
- <sup>44</sup> *Boldt, H. J.* : Keating and Coe's "Clinical Gynecology," 1895, p. 597.
- <sup>45</sup> *Kuppenheim* : Centralblatt für Gynäkologie, S. 916, 1895.
- <sup>46</sup> *Tannen* : Archiv für Gynäkologie, Band XLIX, Heft 3, S. 94-99, 1895.
- <sup>47</sup> *Ahlfeld* : Monatsschrift für Geburtshülfe und Gynäkologie, Band I, Heft 5 u. 6, S. 209-214, 1895 ; also reported by Marchand, *ibid.*, Band I, S. 419-438, 1895.
- <sup>48</sup> *Bacon* : American Journal of Obstetrics, Vol. XXXI, pp. 679-711, May, 1895.
- <sup>49</sup> *Champneys, F. H.* : Practitioner, January, 1896.
- <sup>50</sup> *Runge* : Archiv für Gynäkologie, S. 185, 1896.
- <sup>51</sup> *Appelstedt and Aschoff* : Archiv für Gynäkologie, Band I, Heft 3, S. 5, 1896.
- <sup>52</sup> *Lönnberg and Mannheimer* : Centralblatt für Gynäkologie, No. 18, 1896.
- <sup>53</sup> *Morison* : Obstetric Transactions, London, 1896.
- <sup>54</sup> *Spencer, H. R.* : Obstetric Transactions, London, 1896.
- <sup>55</sup> *Laver, A. H., and Wilkinson, G.* : Quarterly Medical Journal, April, 1894.
- <sup>56</sup> *Leopold* : American Journal of Ob-tetrics, p. 603, October, 1899.
- <sup>57</sup> *Neumann* : Monatsschrift für Geburtshülfe und Gynäkologie, Band III, Heft 5, S. 387, 1896.
- <sup>58</sup> *Acsél, A.* : Monatsschrift für Geburtshülfe und Gynäkologie, Band III, Heft 5, 1896.
- <sup>59</sup> *Cock, J.* : British Medical Journal, December 26, 1896.





